

Varia

#1

An Inaugural Essay
On the Absorbents.
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of
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A function perhaps in the Animal Economy
is involved in greater obscurity, than that per-
formed by the absorbents. Owing to the generally
collapsed state of these vessels in the dead Body,
and the extreme secrecy with which they per-
form their office, they were for a long time entire-
ly unknown, and the phenomena which are now
ascribed to them were either unknown, or suppo-
sed to be the production of the venous system. The
true decomposition and renovation of the animal
body, was now generally if not universally believ-

ed, was a fact never dreamed of by the Ancients. Their ideas of Absorption were confined entirely to the different ~~fluids~~ ^{parts} both within and without the body, and which constitute no part of the living system.

By the labors however of more modern Anatomists a distinct species of vessels has been discovered, and operations of a more important nature than formerly conjectured are found to be carried on the animal body.

Eustachius a Roman Anatomist is considered by some as entitled to the honor of having, tho' accidentally, led the way in those researches, which have terminated in the present improved state of the branch of Anatomy as well as Physiology. In the year 1563 when engaged in the dissection of a horse he observed what is now known to be the primary trunk of the absorbent system. Not being able however to form any idea of its use, this discovery was immediately followed by any very important sequences.

No farther progress was made in this investigation

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until the year 1622, when Asellius another
Italian Anatomist by chance discovered the lac-
teals in a living dog, while occupied in observing
the motion of its diaphragm. He not only pro-
ved their existence, but what was equally impor-
ant, suggested their purpose. This discovery he
extended and confirmed by examining animals
of various species, and by analogy which is now
known to be just, he inferred their existence in
man.

This may be considered as a truly important
epoch in history of anatomy. A species of or-
gans hitherto unknown, but of the highest im-
portance in the Animal Economy, burst upon
the sight and give to physiology a new form.
The attention which novelty ever attracts was
not wanting to the present discovery. Numerous
were those who enlisted themselves on both sides
of the question, some laboring with the warm-
ed zeal in its support, others endeavouring to

present an innovation likely to undermine systems of the longest standing and most inveterated belief. From this period I shall not attempt to pursue the history of these vessels with any degree of minuteness, but endeavour only to give the result of those discoveries, which have at different times been made by various anatomists.

The conjecture of Avicenna respecting the existence of the lacteals in the human body has been fully established by subsequent dissections, and in addition to these, other vessels have been discovered, differing only in their situation and the fluids which they generally convey, and distinguished by the name of lymphatics. The lymphatics tho' first supposed to be specifically different, are now considered as only another branch of the same system with the lacteals, and as constituting with them an entire and distinct species of vessels under the name of absorbents.

After the existence of a new set of vessels was established

established, it then became a subject of contest whether they really performed the office from which they derived their name, and whether they were exclusively employed, or derived assistance in their operations from the venous system. It would be useless to dwell upon the proofs of opinions that are now universally admitted. That the lacteals absorb has been demonstrated by repeated experiments, and the absorption of the lymphatics, tho' perhaps not susceptible of decision by experiments equally unexceptionable as those by which the absorption of the lacteals was determined, is nevertheless founded upon facts which render it equally certain, and exclude even the possibility of doubt. Perhaps the most unequivocal proof of lymphatic absorption, is that which is derived from those vessels continuing to receive and transmit their fluids after the other parts of the body have become inactive, and have ceased to exhibit the signs of life.

The question still remains whether these vessels are the only absorbents in the body, or whether the veins participate in that action. That the lymphatics, by which term I comprehend the whole absorbent system, are the exclusive agents in absorption, would seem to be probable from several considerations, first, from the simplicity of nature, who never employs for the execution of any purpose more instruments than are absolutely necessary, secondly, from the apparent incapacity of the veins for this office, and thirdly, they do absorb, from their having in no instance been uncontestedly detected in that action.

The veins appear to be deficient in that contractile power which is necessary in absorbents, in order to propel their fluids into the general circulation. Fordyce denies the possibility of venous absorption upon the principles of hydraulics, his words are these, "In a living animal where the veins are contracting and pressing the blood, if one end of a capillary tube terminate in a vein and the other in a cavity, and if there be no action in that tube, or

cepting that which arises from its being a capillary
one; or from the motion of the blood in the vein; if
there be any motion in that tube after it is full,
it will always be from the vein into the cavity and
never from the cavity into the vein, let the tube
be of any size or shape whatever. Now the vein
being allowed to possess little if any thing more
than elasticity, would be precisely upon the same
footing with a capillary tube.

Those experiments which proved absorption by the
lacteals would appear to be equally decisive
against venous absorption, unless we allow par-
ticular parts out of the venous system to be en-
dowed with this power.

The only places in which it has been maintain-
ed with any degree of probability that the veins
absorb, are the placenta, the lungs and corpora
cavernosa penis, where they are said to arise by
open mouths. Blumenbach and Charles Bell
say expressly that venous absorption does obtain in
the lungs & corpora cavernosa.

These instances Cruikshank allows that the veins
arise here by open mouths and that the blood enters
into them from the cells in which it had been debar-
red, and mingles with the volume of blood in the cir-
culation. Opposed however to the doctrine of absorp-
tion by the veins in general, he was unwilling to
admit it in any instance, and tells us that he was
once in the habit of explaining this fact upon the
principle of a vis a tergo, and to view it in the light
of a circulation than absorption of the blood. In the
same manner that Harvey explained the pro-
pulsion of the blood from the arteries into the veins in
every part of the body which he ascribed to the in-
trinsic force of the ^{heart} ~~arteries~~ driving the blood not only
thru the parenchymatous substance which he sup-
posed to form a medium of communication between
these vessels, but also into the incipient radicles of the
veins. But Mr Cruikshank afterwards relinquish-
ed this explanation as unsatisfactory, observing that
the cells of the supposed parenchymatous substance
of the placenta &c were not tense at the time of this

apparent venous absorption, which they ought to be,
to render the explanation satisfactory. He does not
appear however to have changed his sentiment upon
the subject of absorption, as he acknowledged his
inability to ^{resist} his seeming objection to the theory which
he had espoused, but rather, with Hodge, who for
the reasons already mentioned, denied the possi-
bility of venous absorption, to have ranked it among
the number of those facts which are not yet per-
fectly comprehended, and which are to be elucidat-
ed by future discoveries. The opinion which con-
siders the Lymphatic system as exclusively employ-
ed in the operation of absorption, derives considerable ad-
ditional weight from the authority of the Professor
of Anatomy in the University of Philadelphia.
We are next to consider the manner in which this op-
eration is performed. No subject perhaps has afforded
more ground for speculation than the present. Where
certainty is unattainable, the imagination considers
itself privileged to indulge in all the wildness of
conjecture.

By some of the earliest theorists upon this subject the
absorbents were considered nearly in the light of insen-
sate tubes, and the solutions which were proposed
of their phenomena, were purely physical. According
to one which is mentioned by Comestachius, the
lymphatics were supposed to suck into the absorbents,
in consequence of vacuums which were continually
forming in the thoracic duct by means of its contract-
ing upon its contents. In order to render this correct,
it would seem necessary that the absorbents be in a state
of continual distension, for if ever they become collap-
sed, there is upon the supposition we are now consider-
ing, no means by which they can again be dilated.
There will then be no vacuum to be occupied, and un-
less they have the power of filling themselves, they will
forever remain empty. But it is well known that the
absorbents have at ^{different times} different degrees of distension and
occasionally collapsed. There are other objections to the
opinion, such as the infinite number of lymphatic
glands, the pressure of the different viscera ~~not~~ which
would afford frequent interruptions to the effect of

arguments in favor of absorption to begin in the capillaries of the vessels simply upon the principle of capillary attraction. To this opinion, as Smith has observed, there appear to be several objections. He inclined to think that there was something like a power of selection in the offices of the absorbents, which enabled them to receive or reject different matters according to the manner in which they were affected by them. This idea of a discriminative power was founded upon the fact of the absorbents having in some instances remained for a considerable time in a fluid without taking up any portion of it. An example of this he mentions to have witnessed in the offices of the lactals or the intestines, where some of the villi were filled with chyle, and thus agree in their immediate neighborhood were perfectly empty. Now this as he observes could not have been the case, if their taking up the fluid had depended solely upon the principle of capillary attraction, as this would have introduced a variation in and without

into it, and under the same circumstances
must always exhibit the same phenomena. Mr. Cru-
ickshank does not, however, seem to have entirely reject-
ed the agency of capillary attraction in the commence-
ment of absorption or in the entrance of the fluids
into the mouths of the absorbents. His words are
thus; "The liquid to be absorbed affects the mouth
of the absorbent, and determines it to give it ad-
mission or not. If it gives it admission, the first
part of the lymphatic absorbs it, perhaps as has
been supposed, by its action as a capillary tube."
Richardson expresses in different words nearly the
same opinion with that which has just been men-
tioned. He is well as Cruickshank is, ascribed to
the mouths of the absorbents a peculiar sensibili-
ty and a power of reject-; or receiving the fluid
absorbed to them. The modifications of which
this function is susceptible from a variety of cir-
cumstances, as age, sex, temperament, &c. he con-
sidered as affording no unreasonable objection to
the opinion of its depending solely upon capillary

principles. The operations of which are always to be distinguished from those of the living system, by their uniformity and want of intermission. I am not sure whether Richardson allows capillaries at traction to be at all concerned in the phenomenon of absorption, but I am myself disposed to adopt the opinion which supposes this function to result from the operation both of a vital and physical principle. It seems not improbable that the act of taking up their contents is similar to that of capillary tubes, but that their being in a state of preparation to perform this action depends upon the exertion of a living power. "Each lymphatic absorbent," says Richardson "when disposed for absorption, creeps, draws with it the surrounding extravascular parts, and thus forms a small tubercle, analogous to the funicula bacrymatia." When in this state I suppose the lymph to enter them exactly in the same manner as so many capillary tubes, but in assuming this state they exert a living power, with respect to the peculiar sensibility or power of

selection which is ascribed to these vessels, there
appears to be no evidence so indisputable as to
force conviction, or to render it impossible to enter
even a doubt upon the subject. It would appear
not very easy to explain why the same liquid
should be taken up by some of the absorbents, and
rejected by others upon the principle of a power
of selection. If they really had such a power
could it not in all probability be exerted in favor

of comparatively a small number of substances
and those of an innocent nature? The principal
object of such a discrimination between the articles
received would certainly be to guard against the in-
troduction of noxious substances into the system, so
that this object is not attained is sufficiently evi-
dent from the dreadful effect which too frequently
presents themselves, occasioned by the absorption of sub-
stances destructive not only to the vessels which take
them up, but to the whole body. There is not, in
reason to suppose that the vessels which take up the
various, the venereal and the various matters

not receive any substance whatever when reduc-
ed to a state of sufficient tenuity to enter their
orifices. There appears to be little reason to con-
sider the lymphatics as exempt from the laws
which regulate muscular action in general. It
is natural to suppose that they like every
other part of the living system, require intervals
of rest, and that every undue or long continued ex-
ercision of their power is followed by a state of tor-
por or indisposition to its renewal. Will not this
view of the subject enable us to account for the fact
mentioned by Saunderson, without the neces-
sity of supposing that there is a particular selec-
tivity or power of selection in the absorbents,
which seems to be opposed by many considera-
tions. We may it be asked, "why should the
absorbents possess such a power, with so little
discretion in the exercise of it?" I should feel it in-
convenient on myself to offer some apology for expressing

an opinion in opposition to such high authority as that
which has been mentioned, did I not think that in
doing so I have the sanction of authority at least equal,
and in my own opinion far superior.

In the very cursory remarks which I have made upon
the absorbents, I am aware that I have noticed but a
part of the operations which are ascribed to them. They
are said to be perpetually taking down the different parts
of the body as fast as they are formed by the arteries, and
that thus by the action of the two systems, the body is
as it were always in a state of fluctuation or in other
words is constantly undergoing the operation
renewing.

That some of the solid parts of the body at par-
ticular periods of life and in certain cases of disease
are removed, there can be no doubt. But it is still
a subject of question whether they are not decompo-
sed previous to their absorption. "The solids" says
are raised by the agency of the vessels on the chemi-
cal affinities of the circulating fluids. They soon

be resolved by their decomposition, reducing them again
to the state of fluids, or the vessels throw out fluids which
dissolve them; an operation anterior to their absorption." And says Richardson "It should not be forgotten that
organized living matter internally agitated by a double
motion, compounds and decomposes itself continually." Altho perhaps we are not able to explain how this
decomposition is effected, yet the apparent impos-
sibility that solid substances as muscles, tendons
&c. should be removed by such instruments as the
absorbent vessels, without first undergoing a change
in their texture, would seem to afford sufficient rea-
son for believing that such a change does take place.
Putting the question out of the question, is it
perfectly certain, that every part of the body
does undergo the perpetual resolution which
has been already mentioned? That there is
no part of the body which may not occasionally
experience a change in the particles of which it
is composed, in consequence of accident or disease
I can readily conceive, but I must confess that

I am not able to discover any reason why an animal
have any more than a wooden one which is per-
petually undergoing a change in the materials
of which it is composed, should experience the ravages
of time, or why an animal which may be con-
sidered as regenerated every eight or ten years should
ever die of longevity.